Emissions Inventory

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Overview

- How and Why Does New Jersey Prepare and Prepare an Emission Inventory?
- What are the different sectors of the Inventory?
- Uses of the Emission Inventory
- What does New Jersey’s Emission Inventory Tell Us?

Why Does New Jersey Prepare an Emissions Inventory?

- Required by the Clean Air Act
- Required by the USEPA Consolidated Emissions Reporting Rule

Base and Projection Year Inventories

- Base Year = 2002

- Projection Year Inventories:
  - Account for Growth
  - Account for Future Air Pollution Controls

Sectors of the Inventory

- Point
- Area
- On-Road
- Non-Road
- Naturally-Occurring Emissions

How Does New Jersey Prepare an Emission Inventory

- Point Sources are directly surveyed by the Emission Statement program. Potential to emit thresholds apply

- Area Sources are calculated using U.S. Bureau of Census population data, Energy Department Fuel Use data, DOL employment data and any other data.

Area Source Calculations:

- Emissions = {EF x AL x SAF x [1- (CE x RE x RP)]}/ (AADF x CF)
- Where:
  - EF = Emission Factor
  - AL = Annual Activity Level
  - SAF = Seasonal Adjustment Factor
  - CE = Control Efficiency
  - RE = Rule Effectiveness
  - RP = Rule Penetration
  - AADF = Annual Activity Day Factor
  - CF = Conversion Factor

How Does New Jersey Prepare an Emission Inventory continued

On-Road Mobile Sources are calculated using the USEPA's MOBILE6 model (from data supplied by the Metropolitan Planning Organizations)

MOBILE6 model inputs include:

- Vehicle Speed Distributions
- Vehicle Age Distributions
- I/M Program Specifics
- Fuel Specifications
- Temperature and Humidity

Emissions Factors (from MOBILE6) X VMT = Emissions

How Does New Jersey Prepare an Emission Inventory continued

- Non-Road Sources (e.g.: Construction equipment, hi-lows, tractors, bulldozers) are calculated using EPA's NONROAD 2004 model

- Aircraft, Commercial Marine Vessels and locomotives are calculated separately using Port Authority, Military and other data

Naturally-Occurring Emissions

- EPA’s BEIS model
- CMU’s Ammonia model

Adjustments to Fugitive Emissions

- USEPA Guidance to Adjust “Fugitive Emissions” (e.g.; paved and unpaved roads) by the Transport Fraction.

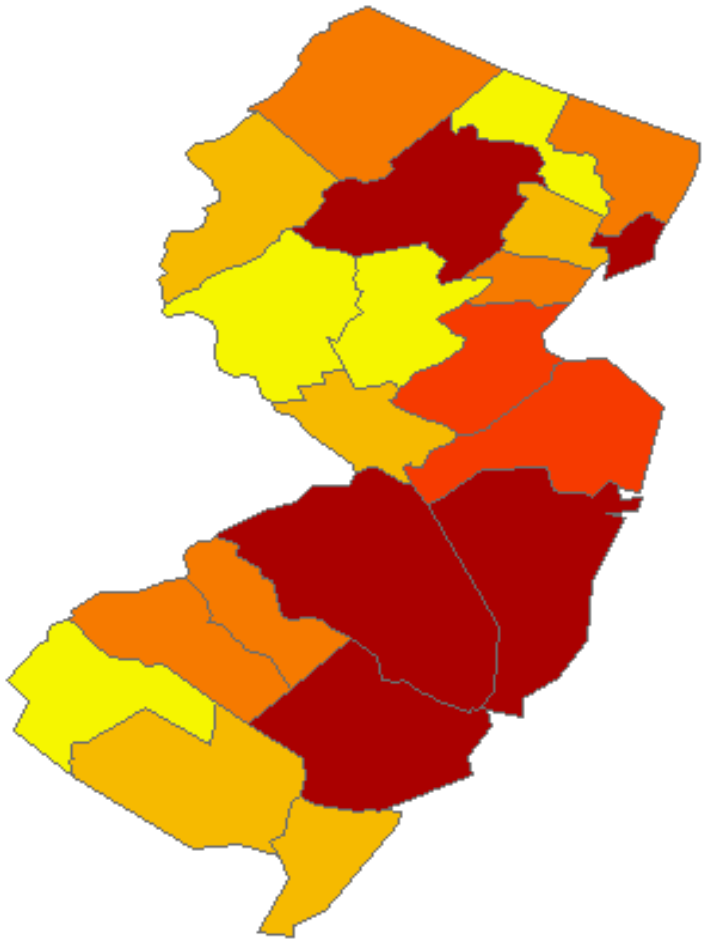
What are the Uses of The Emissions Inventory?

- Assists in targeting control strategies
- Shows trends in Emissions over time for:
  - Determining the States' progress towards attaining the air quality health-based standards,
  - Developing mid-course reviews of the State's progress
  - Conducting Regional Atmospheric modeling studies of the State's ability to eventually achieve the health-based standards.
- Meets EPA Requirements and Regulations

What Does New Jersey's Emissions Inventory Tell Us?

- Can analyze the Inventory to determine the top categories for each section and for each county.
- To control ozone, we look at VOC, NO_x, and CO as Ozone Precursors for a typical summer day of operation.
- To control $PM_{2.5}$, we look at directly emitted particles < 2.5 microns, VOC, NO_x, and SO_2 for annual emissions.

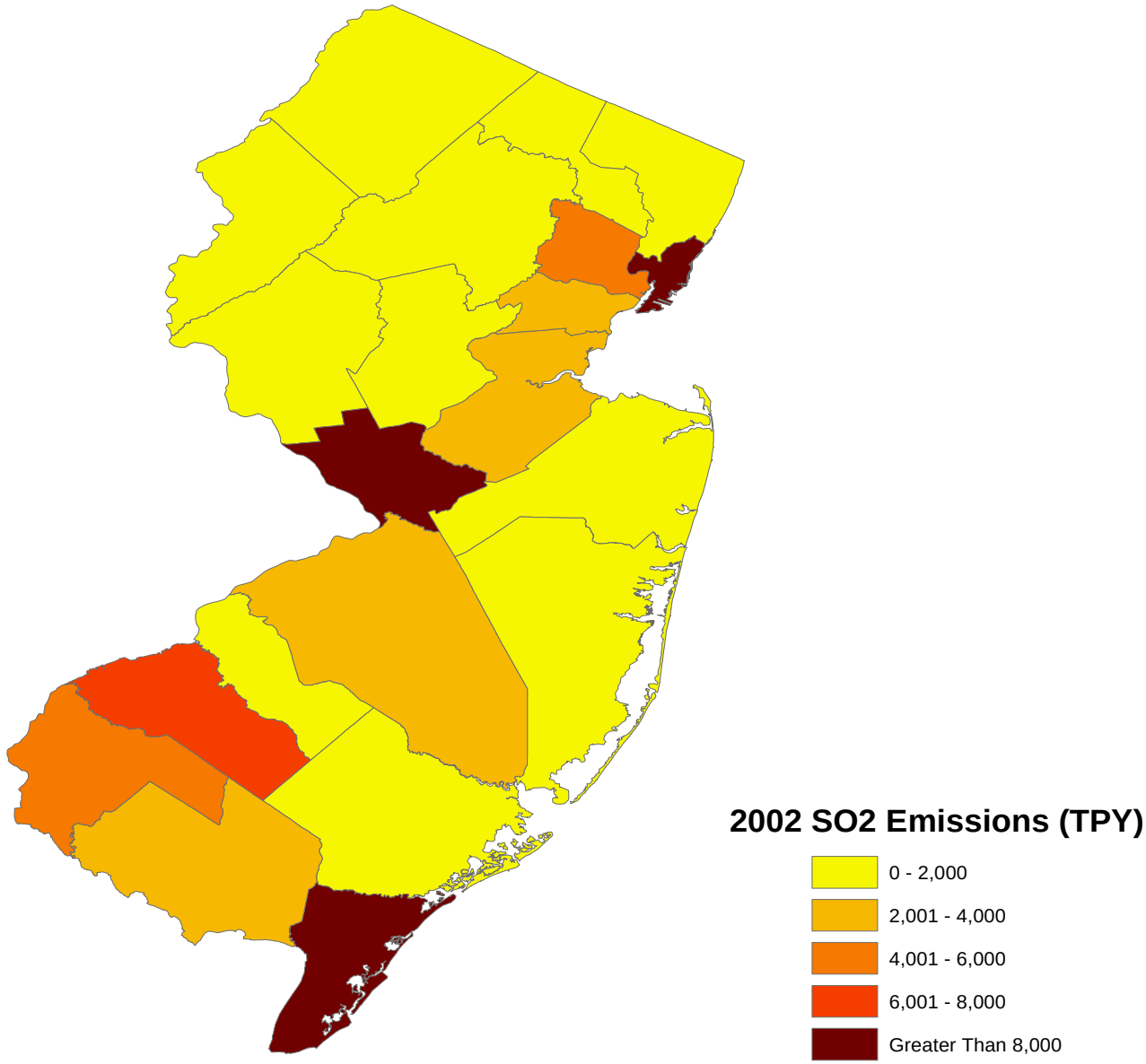
Directly Emitted Fine Particle Emissions - 2002 Inventory



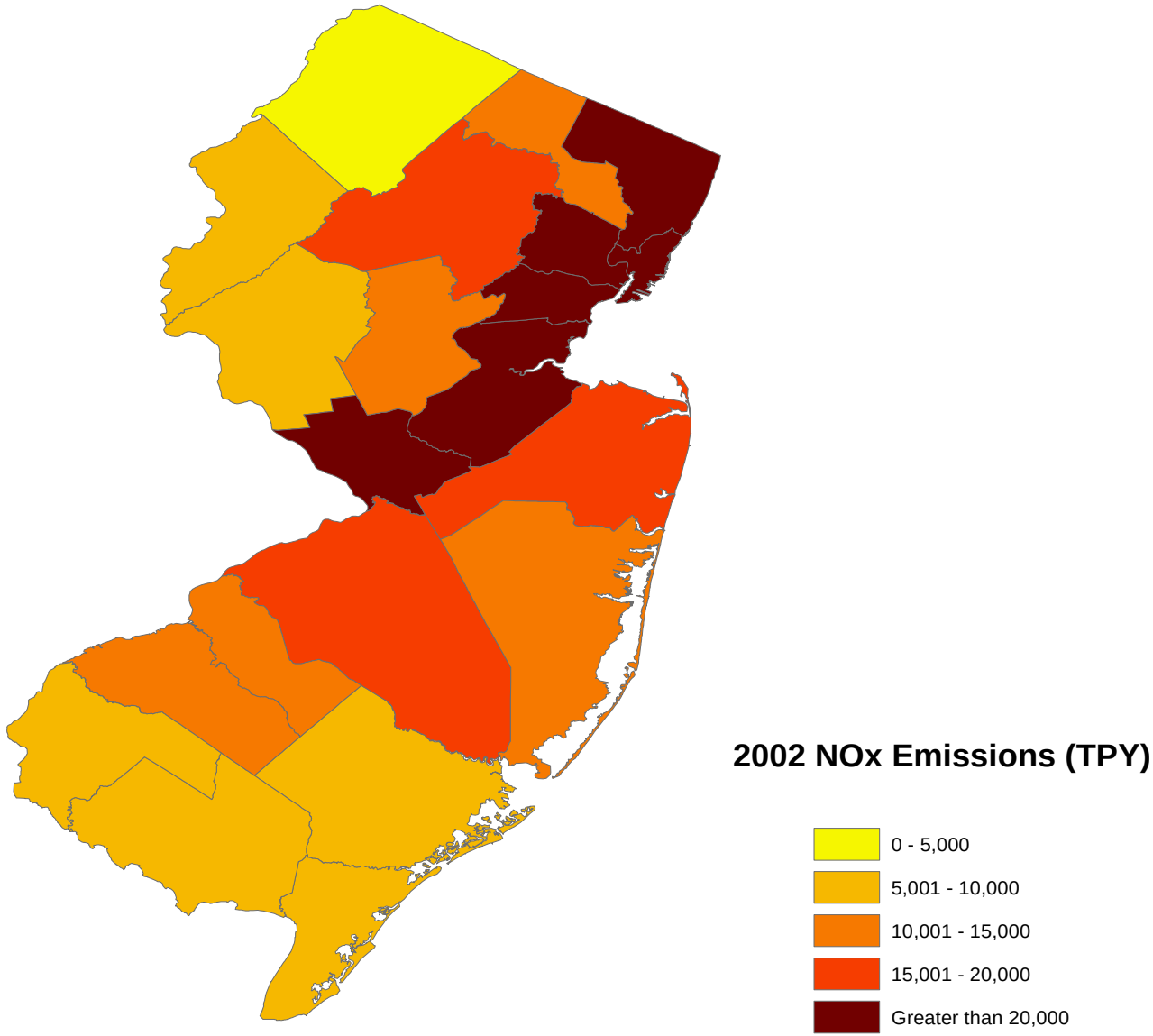
PM Fine Emissions (in Tons Per Year)

- 731 - 1,000
- 1,001 - 1,250
- 1,251 - 1,500
- 1,501 - 1,750
- 1,751 - 2,327

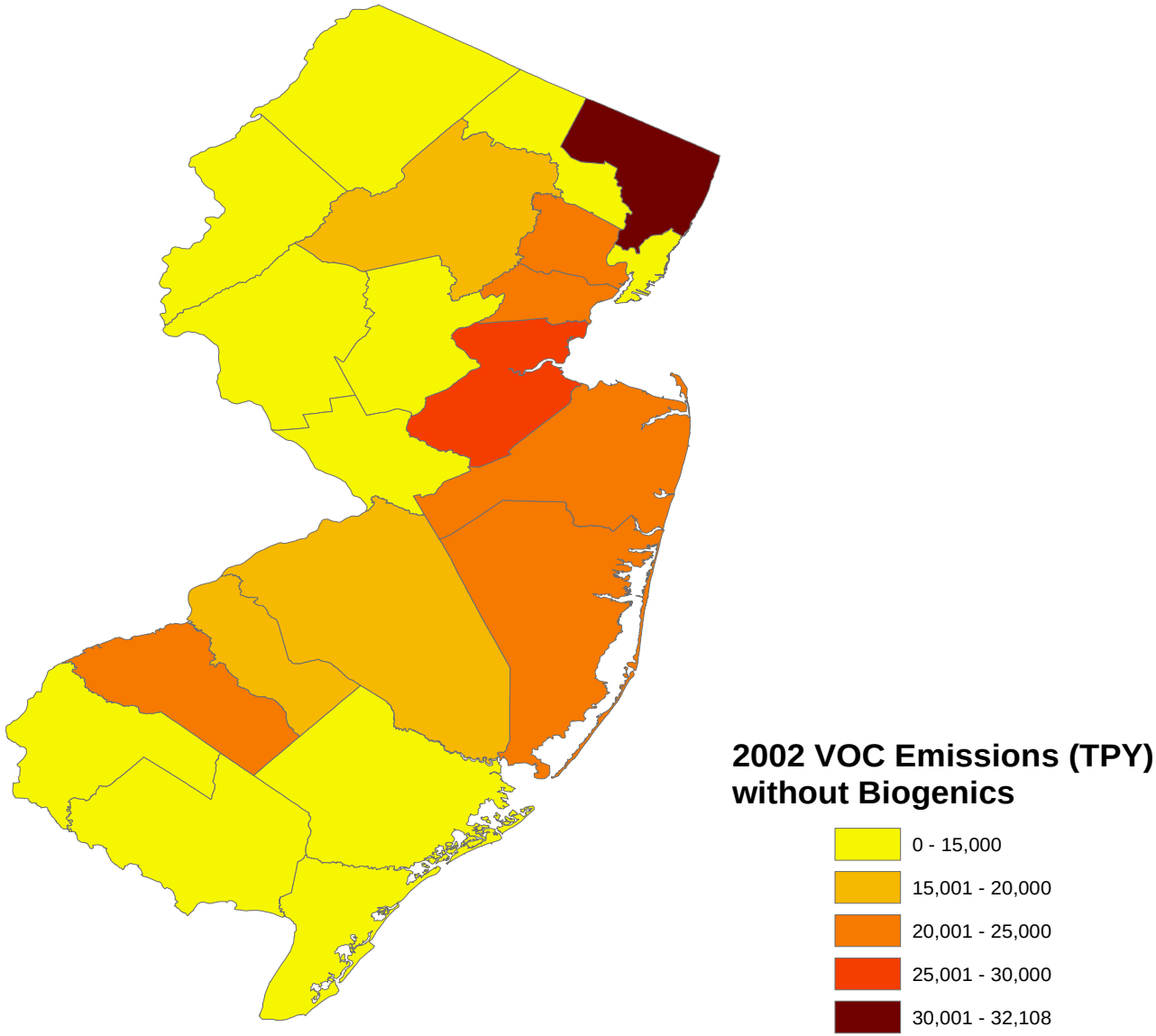
SO2 Emissions (TPY) - 2002 Inventory



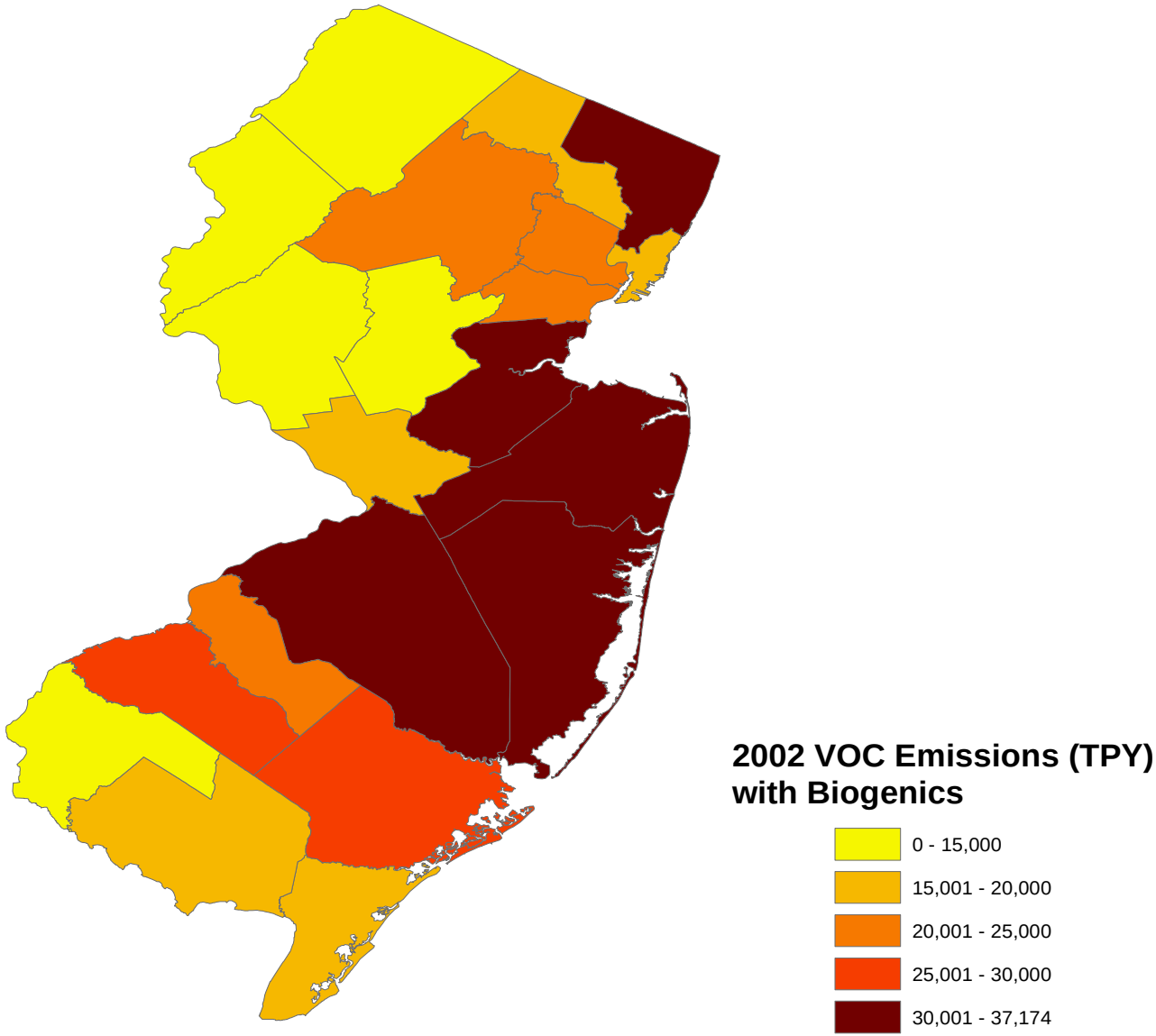
NOx Emissions (TPY) - 2002 Inventory



VOC Emissions (TPY) Without Biogenic Emissions - 2002 Inventory



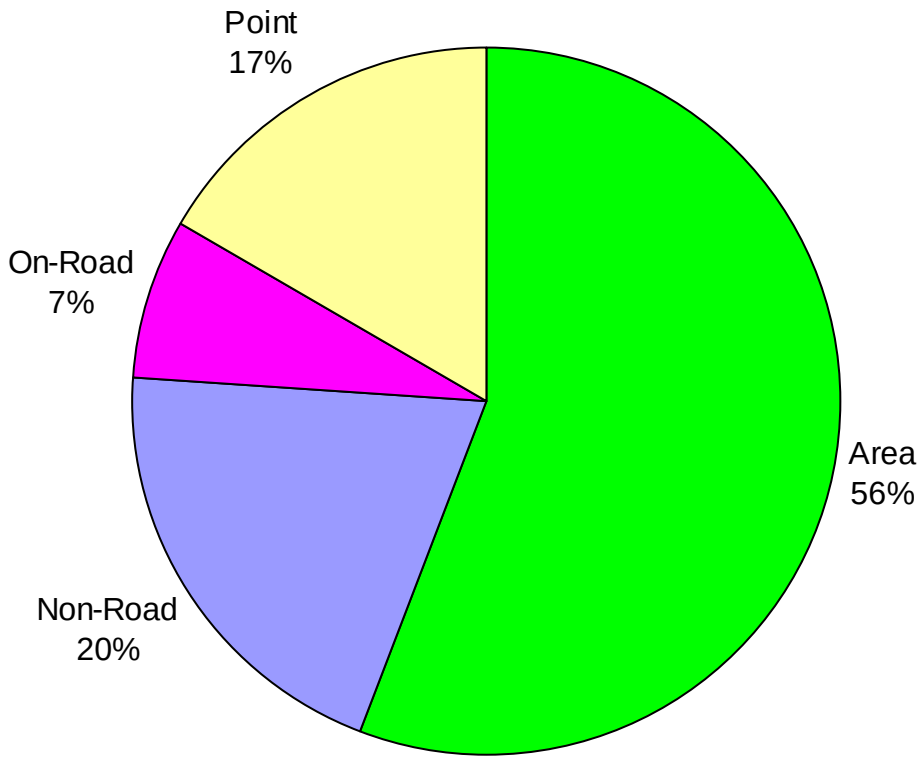
VOC Emissions (TPY) With Biogenic Emissions - 2002 Inventory



Top $PM_{2.5}$ And Ozone Precursor Categories

For Each Source Sector of the Inventory and Adjusted for Fugitive Dust

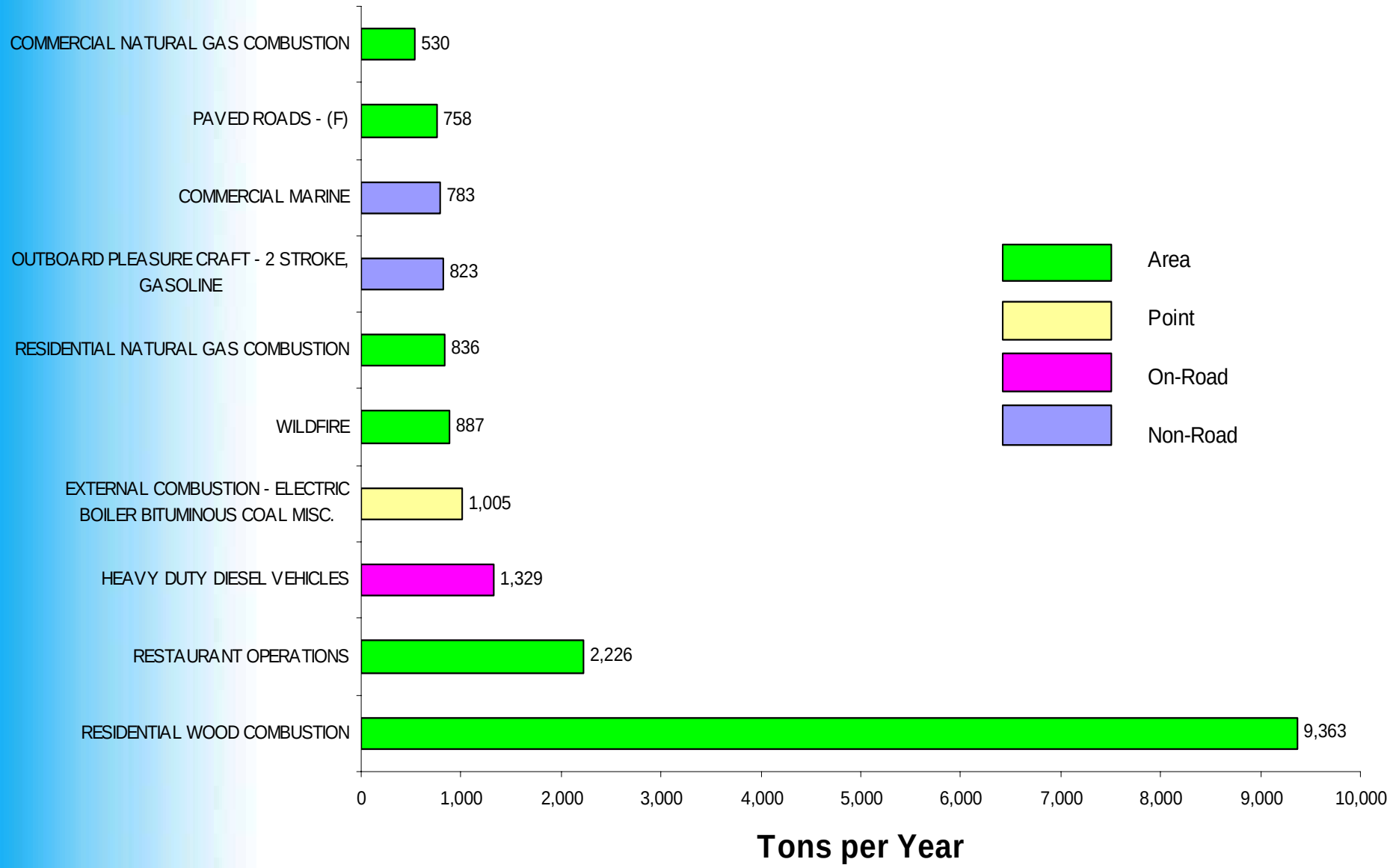
DRAFT 2002 New Jersey $PM_{2.5}$ Emissions by Sector



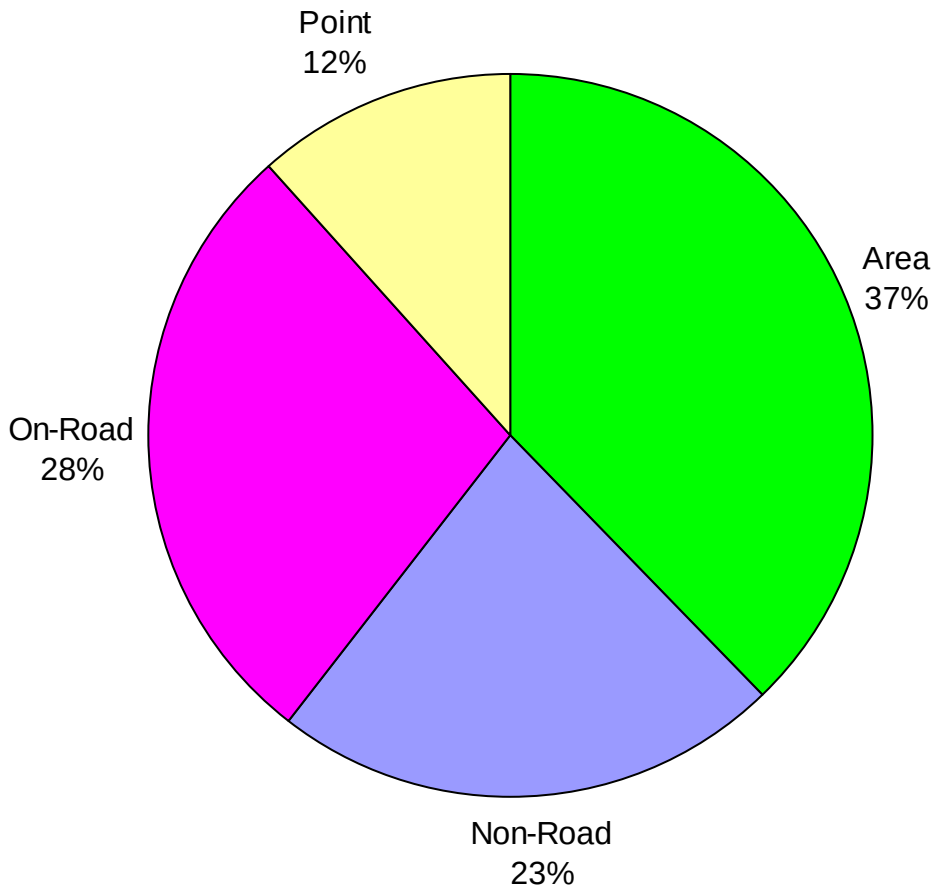
Total $PM_{2.5}$ Emissions - 29,103 tpy

(Includes Adjusted Fugitive Dust Emissions)

DRAFT 2002 New Jersey $PM_{2.5}$ (with adjusted Fugitive Dust) Emission Inventory Top 10

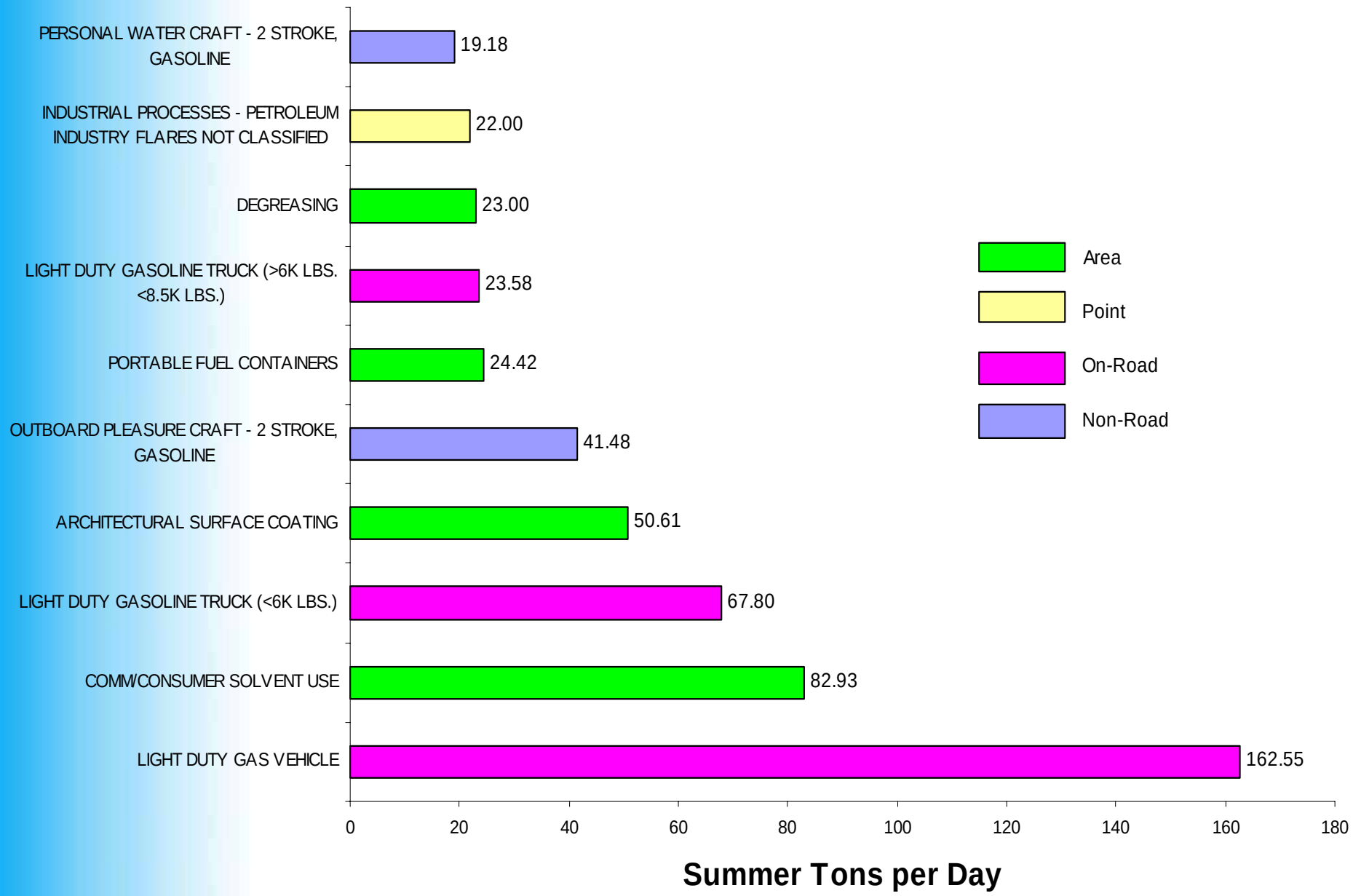


DRAFT 2002 New Jersey VOC Emissions by Sector

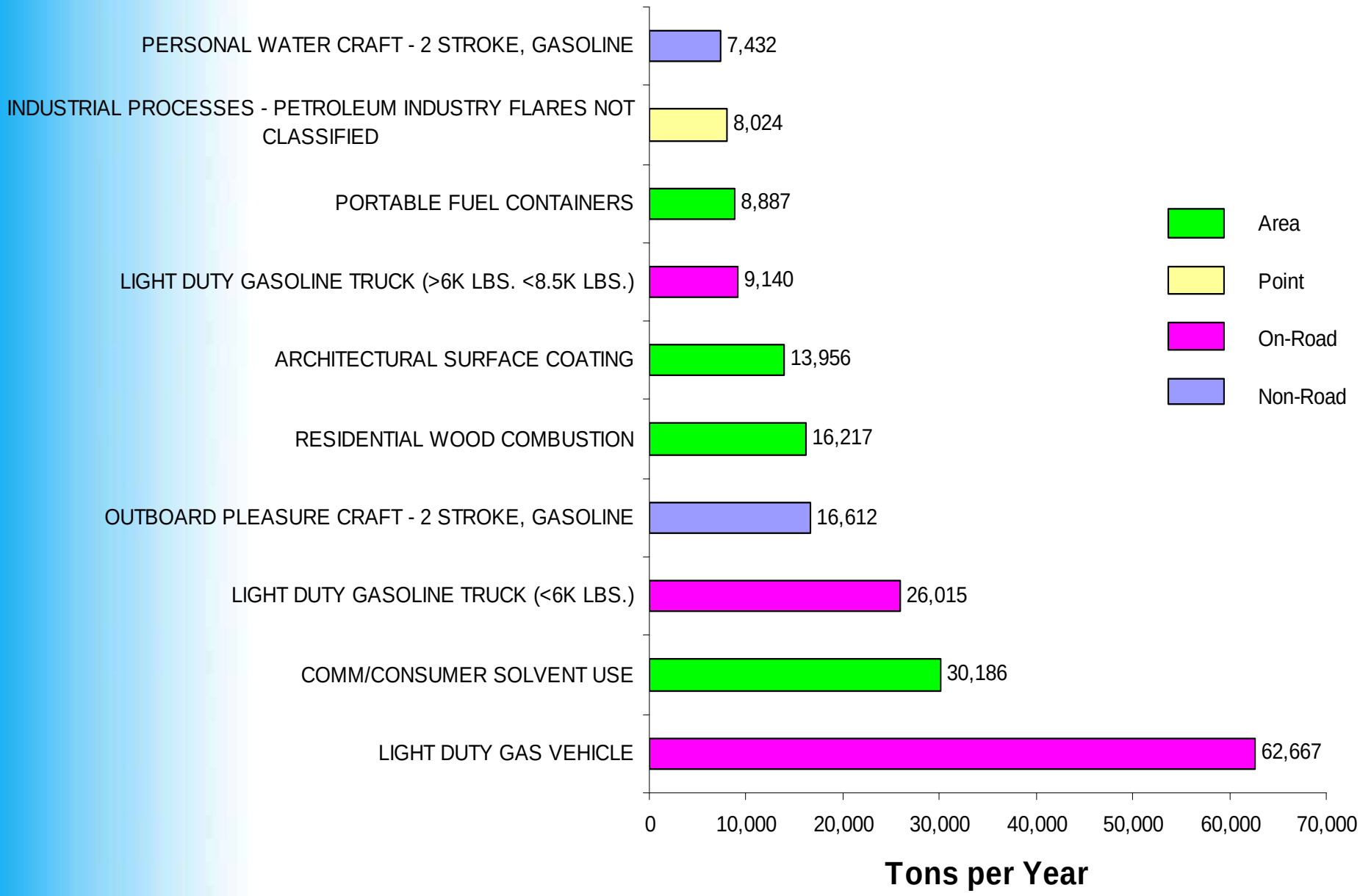


Total VOC Emissions - 977 tpd
(Anthropogenic Sources Only)

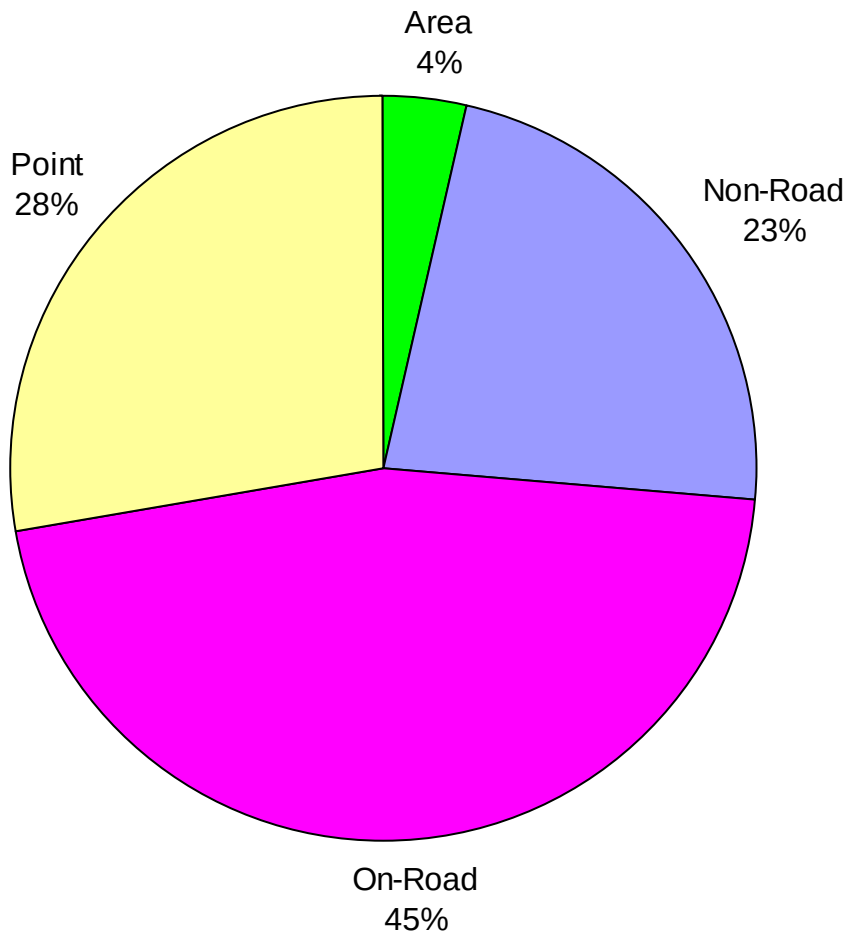
DRAFT 2002 New Jersey VOC Emission Inventory Top 10



DRAFT 2002 New Jersey VOC Emission Inventory Top 10



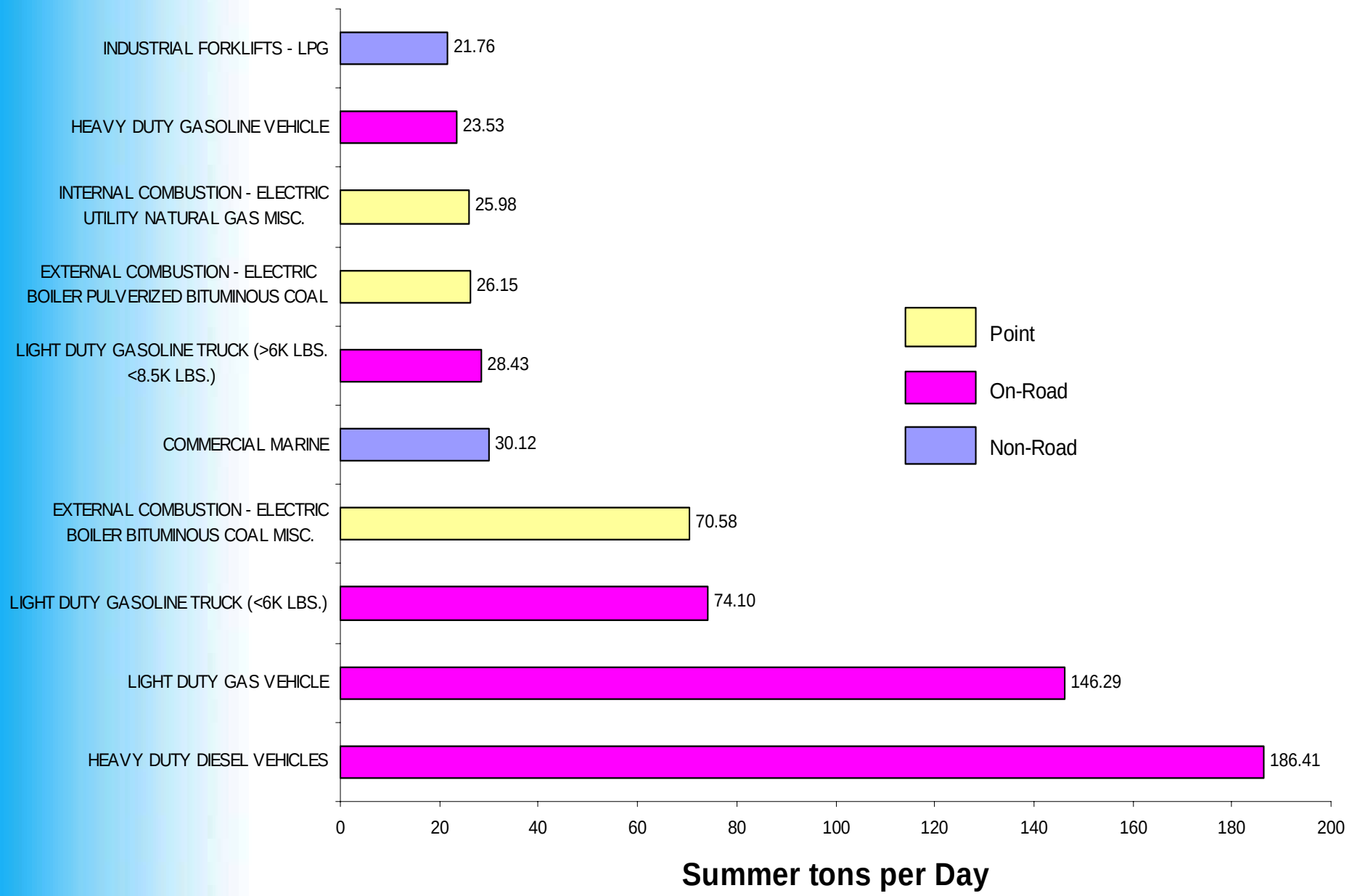
DRAFT 2002 New Jersey NO_x Emissions by Sector



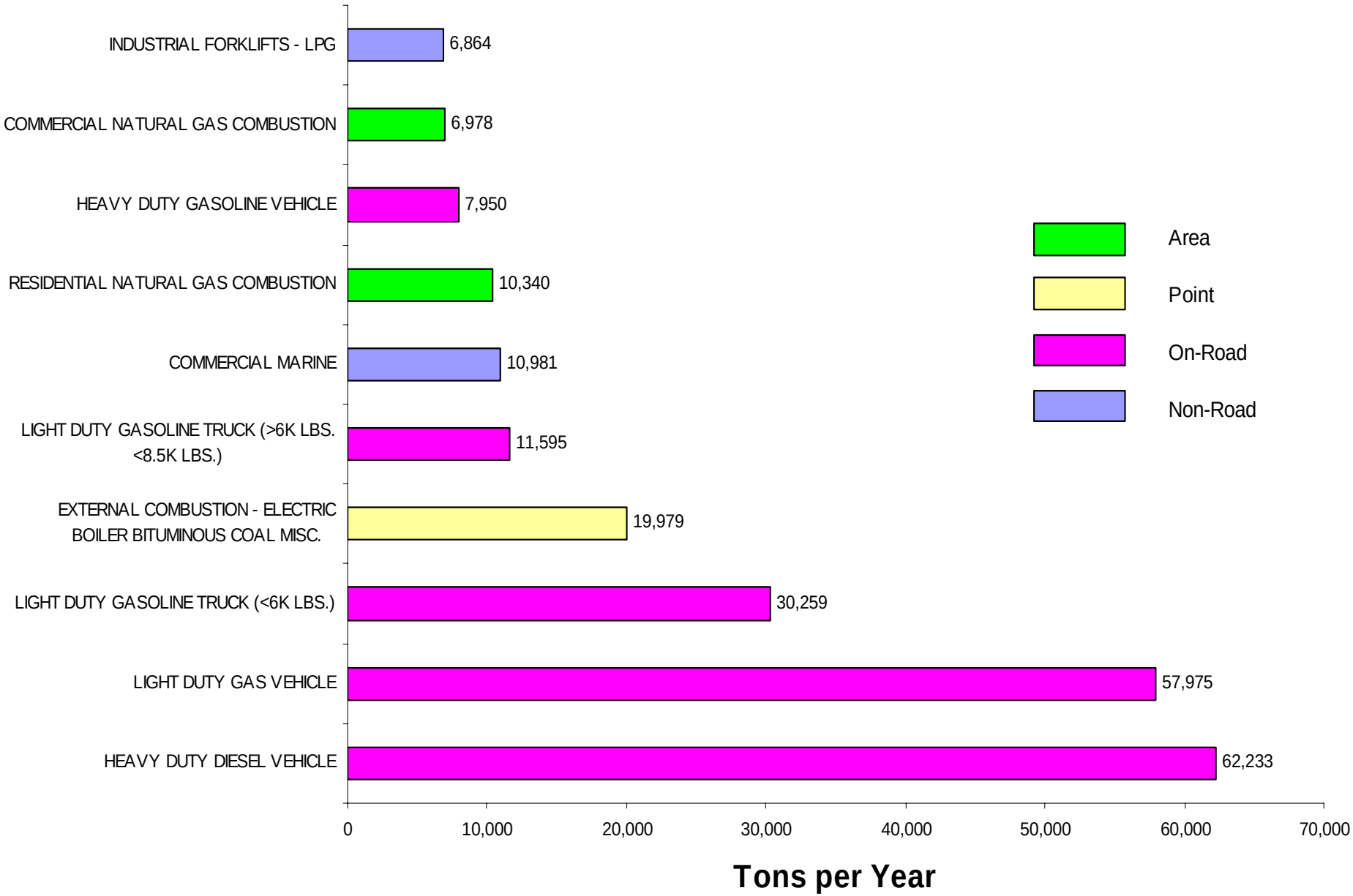
Total No_x Emissions - 1,009 tpd

(Anthropogenic Sources Only)

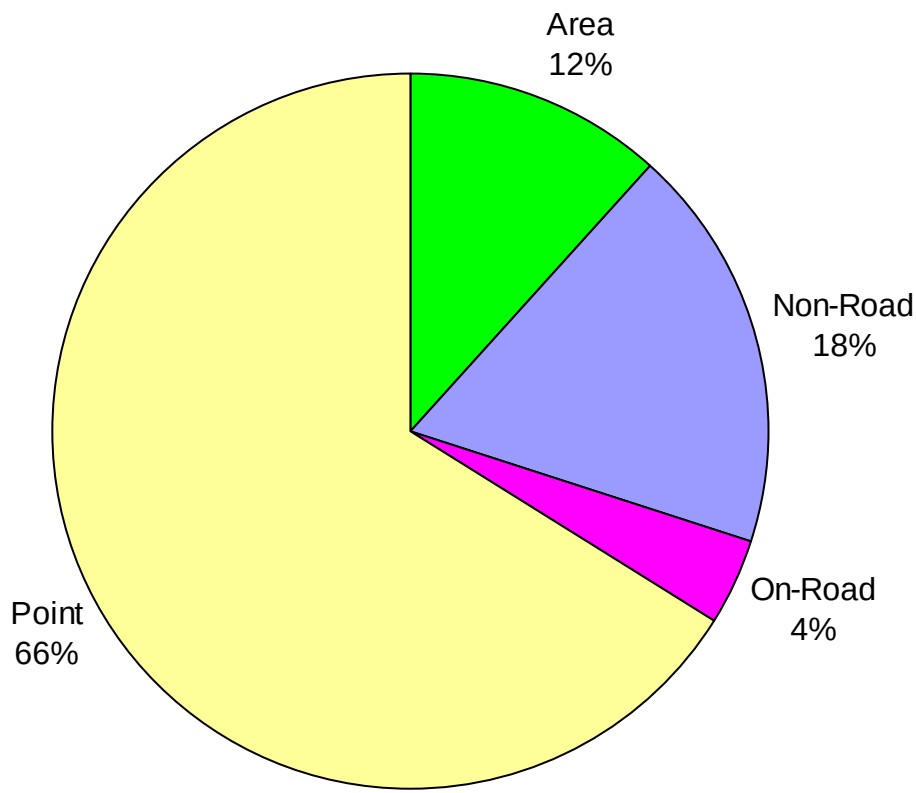
DRAFT 2002 New Jersey NOx Emission Inventory Top 10



DRAFT 2002 New Jersey NOx Emission Inventory Top 10

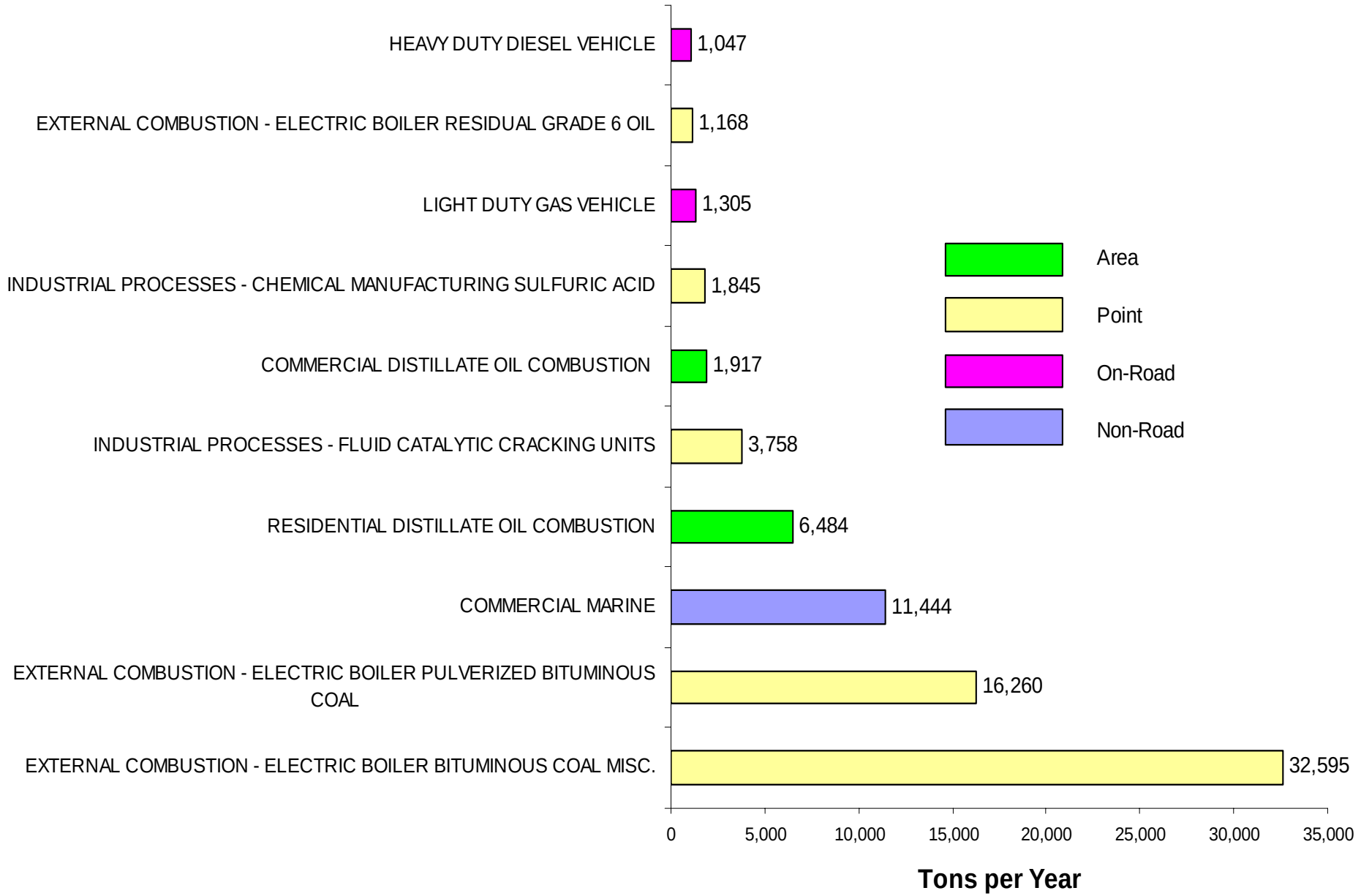


DRAFT 2002 New Jersey SO2 Emissions by Sector

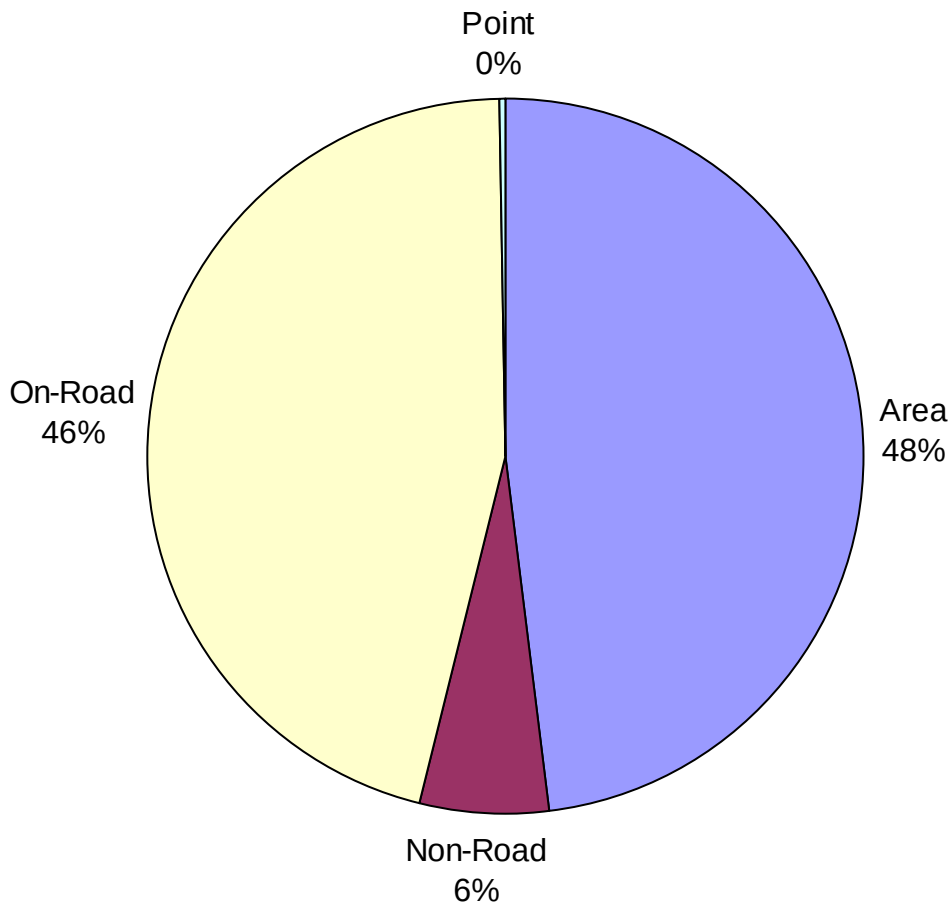


Total SO2 Emissions - 88,936 tpy

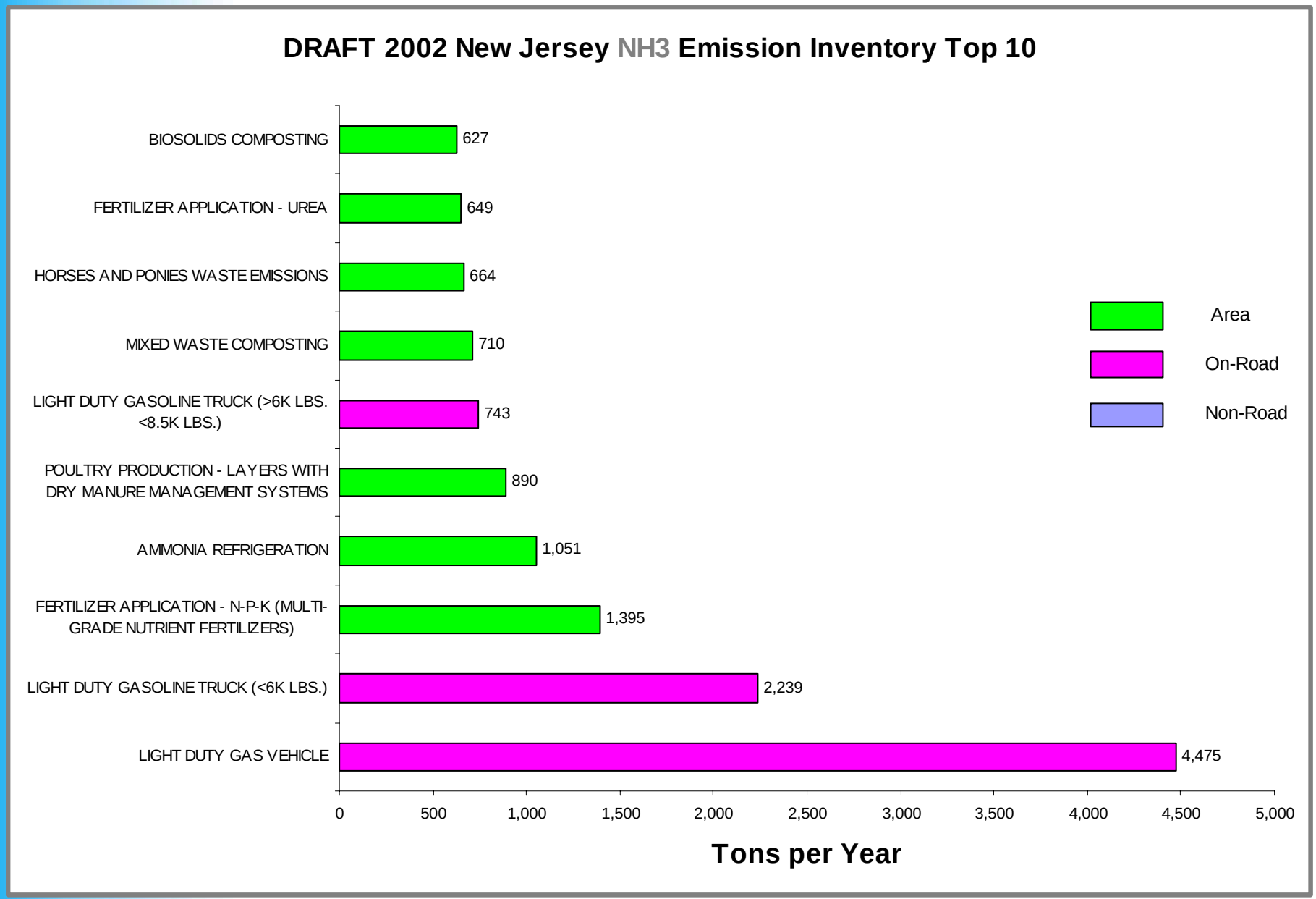
2002 New Jersey SO2 Emission Inventory Top 10 by SCC



DRAFT 2002 New Jersey NH3 Emissions by Sector



Total NH3 Emissions -16,628 tpy
(Anthropogenic Sources Only)


DRAFT 2002 New Jersey NH3 Emission Inventory Top 10
BIOSOLIDS COMPOSTING
627
FERTILIZER APPLICATION - UREA
649
HORSES AND PONIES WASTE EMISSIONS
664
MIXED WASTE COMPOSTING
710
LIGHT DUTY GASOLINE TRUCK (>6K LBS. <8.5K LBS.)
743
POULTRY PRODUCTION - LAYERS WITH DRY MANURE MANAGEMENT SYSTEMS
890
AMMONIA REFRIGERATION
1,051
FERTILIZER APPLICATION - N-P-K (MULTI-GRADE NUTRIENT FERTILIZERS)
1,395
LIGHT DUTY GASOLINE TRUCK (<6K LBS.)
2,239
LIGHT DUTY GAS VEHICLE
4,475
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Tons per Year
Area
On-Road
Non-Road

Conclusion

- The Inventory is a valuable tool for identifying large sources of emissions.
- Through Public Hearings, outside review, and, as better data develops, the inventory will improve.